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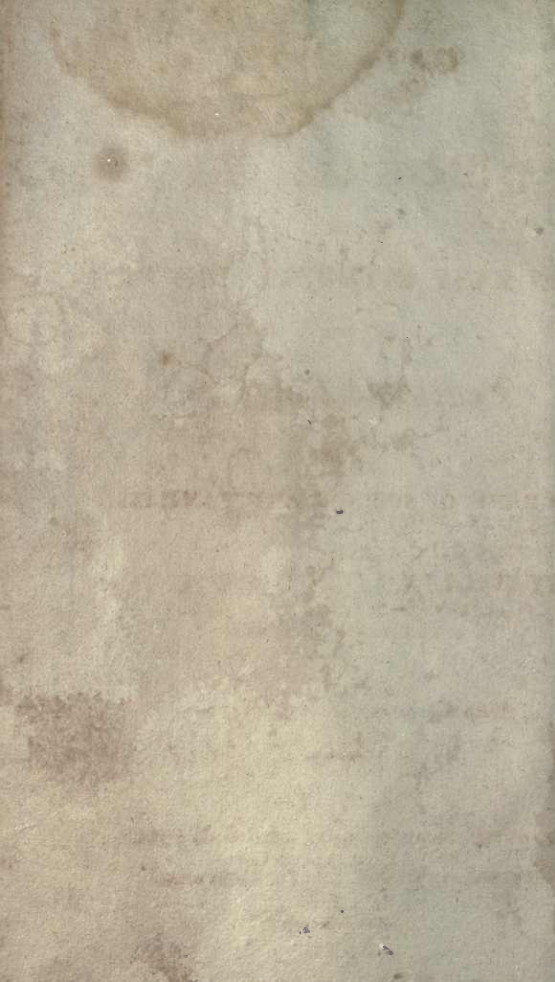
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CATECHISM

OF

BOTANY;

OR,

AN EASY INTRODUCTION TO

THE

Vegetable Kingdom :

FOR

THE USE OF SCHOOLS AND FAMILIES.

BY WILLIAM MAVOR, L. L. D.

AUTHOR OF TRAVELS, AND MANY
OTHER POPULAR WORKS.

With Alterations and Improvements.

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C. Bot

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To expatiate in favour of an acquaintance with Botany, and to enumerate the superior advantages of the Linnæan arrangement, would be wholly unnecessary. Not only professional men, but most persons of education, of both sexes, either have obtained, or wish to acquire some knowledge of this fascinating science, which gives an interest to the most cultivated scenes; but which is pursued and enjoyed with the greatest effect where nature has been most unpropitious, and where only the shepherd and his flock diversify the landscape. It is in such situations indeed,—on the mountain, or by the side of the stream, on the downs, and in the woods, that the most curious and most inviting productions of nature are to be found. As agriculture extends its influence, the habitats of many plants are destroyed; and the lover of Botany is obliged to seek for gratification where the charms of vegetable nature are unveiled in all their original variety of pleasing forms.

The present humble performance is intended solely as an introduction to the science; and has been drawn up with some care for the use of those to whom it is addressed. As names and distinctions must be acquired, before any further progress can be made in the study; and

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as the tenacious memory of youth is peculiarly fitted for receiving and retaining them, a work of this kind cannot too early be put in their hands. It will be to Botany, what a grammar is to language—the first step, though not the ultimate end. In the last chapter, however, an attempt has been made to enlist curiosity in the service, by showing that Botany is not unproductive of advantage; and that it is not merely a science of names, as the ignorant and the idle have wished to represent it. If the fruits of the earth are applicable to so many valuable purposes, and if danger must arise to those who are not able to distinguish between the salutary and the noxious, no more need be said in favour of a study which equally recommends itself to our reason and to our fancy.

W. MAVOR.

Catechism of Botany.

CHAP. I.

DEFINITIONS.

The Parts of Plants, &c.

1. Q. What is the definition of a vegetable ?

A. Vegetables which constitute the second kingdom of nature, according to the definition of Linnæus, "grow and live ;" or they may be described as organical bodies, which draw the matter of their nourishment and growth generally from the earth, by means of pores or vessels, placed on their external surface.

2. Q. Are not vegetables very extensive ?

A. Not less than twenty thousand species have been described. They extend from the small mosses and other minute

plants which are intermixed with the common grass, to the towering pine, and the majestic spreading oak. The various kinds of grasses which cover the earth, the grain from which we receive our nourishment, the flowers of all hues and forms, which captivate by their beauty, and exhale the most fragrant odours, the shrubs which adorn our gardens and plantations, and stately trees that fill our roads and forests, all belong to the vegetable kingdom.

3. Q. Are all plants composed of the same principles ?

A. When subjected to chemical analysis, they are all found to contain calcareous earth, oil, water, and air, with a small portion of iron, to which last principle they owe their beautiful colours. But though more or less of the same materials enter into the composition of each, they are as much diversified in their qualities as in their forms.

4. Q. Is the inward structure of plants the same ?

A. Though the inward structure must of necessity be as diversified as the external form, all plants on dissection, when viewed by the aid of microscopes, appear to be interwoven with complicated meshes, which vary in endless diversity, yet are perfectly regular in the same objects.

5. Q. Are there not various natural divisions of plants ?

A. Without regarding the natural families of plants, as they are called, or such as resemble each other in their general appearance, which it would lead me too far to particularize in this place, plants may be divided into such as are herbaceous, shrubby, or trees ; into such as are annual, biennial, or perennial ; and into such as are indigenous or exotic .

6. Q. Is not the knowledge of plants very useful ?

A. Without some knowledge of plants, we should not be able to distinguish between such as are noxious and such as are good for food, or for the various purposes of life.

7. Q. How is the knowledge of plants to be acquired?

A. By the study of botany; a science which formerly implied an acquaintance with the nature, uses, and cultivation of vegetables; but which in its modern acceptation, is applied, in the first instance at least, to the classification of plants; or that systematic arrangement by which, from general marks or characters, the botanist is enabled to refer them to their proper place in the system. Without this, all would be confusion.

8. Q. Are not systems arbitrary?

A. In some measure they are; and a variety of systems have been invented and rejected; but that of Linnæus, as the simplest and most certain, and which is founded on the parts of fructification, which will hereafter be explained, has gained, as it deserves general adoption, under the name of the sexual system.

9. Q. Of how many parts does a plant consist?

A. Every perfect plant consists of a root, trunk, leaves, props, fructification, and inflorescence; to which may be added the habit, and the hybernaculum.

10. Q. Of how many parts does the root consist?

A. It consists of two parts, the caudex and the radicle.

11. Q. What is the caudex?

A. The caudex, or stump, is the body or stock of the root, from which the trunk or branches ascend, and the fibrous parts descend; and, according to the nature of the plant, is either solid, as in trees; bulbous, as in tulips; or tuberosc, as in piony. There are also some other distinctions as to roots.

12. Q. What is the radicle?

A. The radicle or little root, is the fibrous part of the grand root, which, descending from it, enables it to draw nourishment from the earth, for the support of the plant; and without which it could not live.

13. Q. What is the trunk of plants?

A. The trunk is that part which rises immediately from the caudex or root, and supports the branches, leaves, flowers, and fruit. It is either herbaceous, shrubby, or arborescent; and according to its shape, substance, surface, and other qualities, is called a caulis, a culmus, a scapus, or a stipes, all of which it is necessary to distinguish.

14. **Q.** Please to inform me then what is a caulis.

A. A caulis or stem, is the proper trunk of the plant, and serves to elevate the leaves and fructification. It is denominated simple, when it does not divide, and compound, when it parts into branches.

15. **Q.** What is a culmus ?

A. Culmus, a straw, is the proper stem or trunk of grasses, and serves both to elevate and support the leaves and fructification. Like the caulis it admits of various distinctions.

16. **Q.** What is the scapus ?

A. Scapus, or stalk, is an universal trunk,

raising the fructification, but not the leaves, and proceeds immediately from the root.

17. Q. What is a stipes ?

A. Stipes, which means the trunk or stock of plants in general, is applied by Linnaeus only to palms, ferns, and fungi. It is also used to express that slender thread or foot-stalk which elevates the feathery or hairy down with which some seeds are furnished.

18. Q. Are there not various kinds of leaves ?

A. Leaves are divided, generally, into simple and compound ; but these again receive different denominations, according to their figure, situation, insertion, number, divisions, &c. for which I must refer you to larger works.

19. Q. What is a simple leaf ?

A. Simple leaves are such as adhere to the branch singly, or whose foot-stalks are parted by a single expansion. They have different names according to their shape, surface and divisions.

20. Q. What is a compound leaf ?

A. Compound leaves are when there are more than one on the same foot-stalk, and are considered in regard to structure and degree. Leaves are the organs of respiration and motion.

21. Q. What are props ?

A. Props or fulcra, express those small parts of plants, of which the chief use is to strengthen and support them. They may be either a *petiolus*, or foot-stalk, supporting a leaf ; a *pendunculus*, or foot-stalk supporting a flower ; a *stipula*, which is applied to a sort of scale or small leaf, stationed on each side of the base of the foot-stalk of the petioles or peduncles, when they first appear, for the purpose of support ; a *cirrhus*, clasper, or tendril, which denotes the fine spiral string or fibre, by which plants fasten themselves to some other body for support ; *pubes*, a term used to express the hair, down, beard, bristles, and glands, as well as several other substances, in different parts of plants, serving either for defence,

or vessels of secretion ; and *bractææ*, or floral leaves, which express not only the leaves situated on the stalk, nearest the lower parts of the flower, but also those which sometimes terminate the flower stalk.

22. Q. What is the fructification ?

A. As the Linnæan system is founded on the fructification of plants, this requires to be particularly described in the sequel. We shall therefore, proceed to the next constituent part of plants, namely, inflorescence.

23. Q. What is meant by inflorescence ?

A. It is the manner in which flowers are joined to their several peduncles ; and admits of several varieties, all distinguished by appropriate names. Flowers may be complete, simple or aggregate.

24. Q. What is a complete flower ?

A. A flower is said to be complete, when all parts are present ; it is either simple or aggregate.

25. Q. What is a simple flower ?

A. It is so called when no part of the fructification is common to more than one flower or floret.

26. Q. What is an aggregate flower ?

A. An aggregate flower consists of many florets, collected into one head, by means of some parts of the fructification, common to them all. Of inflorescence in general arise several distinctions, according to the structure, disposition and other circumstances of the parts.

27. Q. Will you name those distinctions ?

A. The principal are the following, and they often serve to discriminate species which makes them the more necessary to be known.

1. Verticillate.—When the flowers are placed in whorls, at each joint round the common stalk.
2. Capitulate.—When many flowers are collected into nearly a globular form or head, upon the summit of the common stalks, sometimes with, and sometimes without partial peduncles.

3. Spicate.—When the flowers, having no partial peduncles, are arranged in spikes, alternately, round a common simple peduncle.
4. Corymbate.—When the lesser peduncles of the flowers produced from different parts of the common peduncle or stalk in clusters, which, though of unequal lengths, and single or branched, form a regular surface at the top.
5. Thyrsate.—This expresses a mode of flowering, resembling that of pines.
6. Paniculate.—When the flowers are dispersed among peduncles, variously subdivided, as is common in grasses.
7. Axillarate.—When the flowers proceed from the angle formed by the leaf and the stem, as is most commonly the case.
8. Terminalate.—When the flowers terminate the stalk or branch.

28. Q. What is meant by the habit of plants ?

A. By the habit of plants, the old botanists expressed the whole external appearance

of every part by which they formed their systematic arrangement ; but Linnæus applies this to the agreement of plants of the same genus or natural order, in particular circumstances.

29. Q. What is the hybernaculum of plants ?

A. The hybernaculum, or winter lodgment, is that part of a plant which defends the embryo, or future shoot from external injuries during the winter, and is either a bulb or a bud.

30. Q. How do you describe a bulb ?

A. A bulb is a large sort of bud, if it may be so called, produced under ground, and placed on the caudex of certain herbaceous plants, hence termed bulbous, all of which are perennial, or perpetuated by their bulbs, as well as by seed.

31. Q. How do you describe a bud ?

A. A bud may be denominated the embryo of the plant, and is seated on the stem of the branches, and covered with scales. Of buds in general, there are three kinds ;

that containing the flower only, as in poplar, ash, &c. that containing the leaves only, as in birch, &c. and that containing both flower and leaves, as is usual in the generality of plants. It is observable, however, that in hot climates few plants have buds; because the plant is exposed to no danger from the coldest weather.

32. Q. What is meant by the sleep of plants?

A. It bears some resemblance to the protection afforded by the buds, and may happen various ways. The most common mode however, is that the young shoots, as well as the flowers, are defended from external injury, by the nearest leaves converging, and enclosing the tender parts. This happens in several plants at the approach of night, and even of rain.

CHAP. II.

The parts of fructification.

1. Q. I think you said that the system of Linnæus is founded on the parts of fructification ?

A. I did ; and as they are the same in all parts of the globe, where vegetables grow, the classification founded on them affords a kind of universal language to botanists, by which they may be mutually understood.

2. Q. What is meant by fructification ?

A. By fructification we understand both the flower and fruit of plants, which, though not present at the same time, cannot be well separated.

3. Q. How many parts of fructification are there ?

A. Seven ;—1. The *calyx*, empalement, or flower-cup. 2. The *corolla*, foliation, or the leaves of the flower. 3. The *stamina*, or male organs of plants, consisting of threads called stamens or chives. 4. The

pistillum, or female organ of plants, called the pistil or pointal. 5. The *pericarpium*, or seed vessel. 6. *Semina*, or seeds themselves, produced when the fructification dies away. 7. The *receptaculum*, or base on which the fructification is seated. The first four are properly parts of the flower; the three last parts of the fruit.

4. Q. Will you describe the calyx?

A. The calyx is the termination of the outer bark of a plant; and its chief use consists in enclosing, supporting, and protecting the other parts of the fructification. It is called a *perianthium*, or flower-cup, when its station is close to the fructification; an *involucrum* or cover, when stationed at the foot of an umbel, at a distance from the flower; an *amentum* or catkin, when it proceeds from one common receptacle, like the chaff of an ear of corn; a *spatha*, or sheathe, when it bursts lengthwise, and puts forth a flower-stalk; a *gluma*, or husk, as in grasses, which it folds over with its valves; a *calyptra*, or veil, as in mosses, where it is placed over

the other parts of fructification ; and a *volva* or enfolder, as in the mushroom tribe, where it is membranaceous and rent on all sides.

5. Q. What is the corolla ?

A. The corolla is the termination of the inner bark of a plant, accompanying the fructification, in the new form of painted or coloured leaves, usually called the blossom, or flower. It is generally seated on the receptacle, though sometimes on the calyx, and serves as an interior fence to the parts which it encloses. Its leaves are called petals ; and if the corolla consists only of one piece, it is called monopetalous ; if of two, dipetalous ; if of three, tripetalous ; and so on, according to the number of petals ; or polypetalous, when they are numerous. The corolla is also distinguished by the division and shape of the leaves, by being inferior or superior to the germen ; and by its duration. To it farther belongs the *nectarium*, or nectary, containing the honey on which bees and other insects feed. This appendage has various forms, which fre-

quently furnish essential characters of plants in the Linnæan arrangement.

6. Q. What are the stamina?

A. The stamens, formerly called chives, are the male part of the flower, and are defined by Linnæus as an entrail of the plant, designed for the preparation of the fructifying dust or pollen. In most flowers, the stamens are placed on the receptacle within the corolla, and round the germen. They are chiefly distinguished by their number; each consists of two parts, the filament and the anthera.

7. Q. What is the filament?

A. The filament is the thread-shaped part of the stamen, that serves as a foot-stalk to elevate the anthers; and sometimes has jags or divisions, which are either two or nine.

8. Q. What are the anthera?

A. The anther, from a Greek word, signifying flower, is emphatically so called from its great utility in the fructification, and is the summit or top of the filament, containing

the impregnating meal or dust, called the pollen. The number of anthers to each filament, varies in different plants. Like the filament, they are also distinguished by their form, or figure, their proportion, and their situation.

9. Q. What is the pistillum ?

A. The pistil, or the female part of the flower, proceeding from the pith of the plant, is that erect column, which is usually placed in the centre of the flower, amidst the stamens, in order to receive the pollen ; and consists of three parts, the germen, the style and the stigma.

10. Q. What is the germen ?

A. The germen is the base of the pistil, and supports the style. After some time it becomes a seed-vessel, and may therefore, be considered as the rudiment of the fruit accompanying the flower, but not yet arrived at maturity. It is distinguished by shape, number, and situation.

11. Q. What is the style ?

A. The style is that part which serves to

elevate the stigma from the germen, in order to receive the influence of the stamens, and to convey it to the germen as through a tube. It is distinguished in various ways, and is often placed on the side of the germen.

12. Q. What is the stigma ?

A. The stigma, when single, is generally placed on the summit of the style ; but, when several, they are placed upon the top, or regularly disposed along the side, and covered with moisture, that they may the better retain the pollen. It is variously distinguished ; and in most plants, withers when the germen becomes a seed-vessel.

13. Q. Have all plants anthers and pistils ?

A. No ; but such plants as want anthers are called *female* ; such as want pistils are called *male* ; such as have them both, *hermaphrodite* ; and such as have neither, *neuter*.

14. Q. What is the pericarpium ?

A. The pericarpium, or seed-vessel, is the germen, brought to maturity, and become a matrix. It is situated at the receptacle of the flower. All plants, however, are not furnished with a seed-vessel; and in many, it is supplied by the calyx, which converging, encloses the seeds till they arrive at maturity; and sometimes the receptacle, and sometimes the nectary performs the office of seed-vessel.

15. Q. Is not the pericarpium distinguished by different names according to its structure?

A. It is a *capsule* when hollow, and cleaving or parting in some determinate manner; it is a *silique*, or pod, when consisting of two valves, wherein the seeds are fastened along both the sutures; it is a *legume*, when it has two valves, with the seeds fastened along one suture only; it is a *conceptacle*, when it consists of a single valve, opening on one side lengthwise, without having the seeds fastened to it; it is a *drupa*, when fleshy or pulpy, without valves, containing a stone; it

is a *pomum*, when fleshy or pulpy, without valve, containing a capsule; it is a *bacca*, or berry, when fleshy or pulpy, without valve, the seeds within having no other covering; and it is a *strobilus*, when formed of a catkin.

16. Q. What are semina?

A. Semina, or seeds, are the essence of the fruit of every vegetable, and defined by the great Swedish botanist as a deciduous part of the plant, containing the rudiments of a new vegetable, fertilized by the sprinkling of the pollen. They are distinguished according to number, shape, texture, and various concomitant circumstances. Every seed properly so called, which is the rudiment of a future vegetable, consists of the *corculum*, or essence of the seed, and the principle of the future plant; the *cotyledons* or the side lobes of the seed, of a porous substance, and perishable; the *hilum*, or external mark or scar on the seed, where it was fastened within the fruit, as in beans, &c. the *arillus*, or the proper exterior coat of

the seed which falls off spontaneously ; and the *coronula* or little crown of the seed, which is either a sort of calyx, adhering to the top of the seed like a little crown, or *pappus*, a down which is either feathery, or hairy, and assists the seed to fly, as in thistles. To these distinctions may be added *nux*, a nut, or seed enclosed in a hard woody substance called a shell ; and *propago*, a slip or shoot, without coat or cotyledon, as in the seeds of moss.

17. Q. What is the receptaculum ?

A. The receptacle is the base which connects and supports the other six parts of fructification ; and hence, it has been sometimes called the nuptial bed of flowers ; but this term more properly belongs to the calyx.

18. Q. Has not the receptacle received various names which are necessary to be known ?

A. Several of the distinctions are of importance. A proper receptacle is when it supports the parts of a single fructification

only ; a receptacle of the flower, when it is a base to which the parts of the flower only are fastened, without the germen ; a receptacle of the fruit, when it is the base of the fruit only, remote from the receptacle of the flower ; and a receptacle of the seeds, when it is the base that fastens the seeds, within the pericarpium. It is also an *umbel*, or receptacle which, from a common centre, runs out into thread-shaped foot-stalks of proportional lengths ; a *cyma*, or cyme, when the receptacle runs into long fastigate peduncles, proceeding from the same universal centre, but with irregular particulars ; and a *spadix*, which is applied to cuckoo-pint, palms, &c.

CHAP. III.

The Linnæan distribution of Vegetables founded on the Sexual System.

1. Q. How has Linnæus divided the vegetable kingdom ?

A. Into classes, orders, genera, species, and varieties.

2. Q. How many classes are there ?

A. Twenty-four.

3. Q. How are the names of the classes formed ?

A. The names of the classes are derived from the Greek, and express the characteristics of each class. The first twelve are named from the Greek numerals, and the word *andria*, referring to the number of their stamens. The fourteenth and fifteenth classes are founded on the proportion of the stamens, and the next five on the connection of the stamens. From the twentieth to the twenty-third inclusive, the classes are formed from the situation of the stamens. The

twenty-fourth consists of plants whose parts of fructification are less conspicuous, and less accurately known, and hence are called *cryptogamus*; while the first twenty-three are styled *phenogamus*, for the contrary reason.

4. Q. From what are the orders formed?

A. In the first thirteen classes they are taken from the number of the female parts, in the same manner as the classes are from the male parts. In the fourteenth class, the orders are derived from a different source, and are divided into *gymnospermia*, comprehending such as have naked seeds; and *angiospermia*, including those that have their seeds covered, or enclosed in a capsule. The fifteenth class is divided into the *sili-culosa*, or such as have a short pod; and the *siliquosa*, or those that have a longer one. The sixteenth, seventeenth, eighteenth and twentieth, derive their orders from the number of stamens. The orders of the nineteenth are variously formed. Those of the twenty-first are taken, partly

from the number of stamens, and partly from the names and characters peculiar to some of the other classes. The orders of the twenty-second class are founded on the number, union and situation of the stamens in the male flowers. Those of the twenty-third are all taken from classical characters; and the twenty-fourth class is divided into four orders, corresponding with the plants ranged under them.

5. Q. This is a good explanation, please now to give me the names of the classes, and the orders belonging to each.

A. They will stand thus :

CLASSES.

ORDERS.

With examples under each.

1. MONANDRIA.	}	1. Monogynia.	2. Digy-
Ginger, Indian arrow-root.		nia.	
2. DIANDRIA.	}	1. Monogynia.	2. Digy-
Jessamine, privet, olive,		nia. 3. Trigynia.	
lilac.	}	1. Monogynia.	2. Digynia.
3. TRIANDRIA.		3. Trigynia.	
Valerian, iris, and the	}	1. Monogynia.	2. Digynia.
grasses.		3. Trigynia.	
4. TETRANDRIA.	}	1. Monogynia.	2. Digynia.
Scabious, teazel, madder,		3. Trigynia.	
holly.			

CLASSES.

ORDERS.

With examples under each.

5. PENTANDRIA.

Bell-flower, bind-weed, mullen, periwinkle, coffee, the rough-leaved plants, as potatoes, and umbelliferous plants, as carraways.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Tetragynia. 5. Pentagynia. 6. Polygynia.

6. HEXANDRIA.

Snow-drop, narcissus, tulip, aloe, hyacinth.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Tetragynia. 5. Polygynia.

7. HEPTANDRIA.

Horse-chestnut, winter-green.

1. Monogynia. 2. Digynia. 3. Tetragynia. 4. Hexagynia.

8. OCTANDRIA.

Indian cress, heath, French willow.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Tetragynia.

9. ENNEANDRIA.

Bay, rhubarb, gladiole.

1. Monogynia. 2. Trigynia. 3. Hexagynia.

10. DECANDRIA.

Fraxinella, rue, lychnis, cassia, arbutis.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Pentagynia. 5. Decagynia.

11. DODECANDRIA.

Purslane, house-leek, agrimony, spurge.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Pentagynia. 5. Dodecagynia.

12. ICOSANDRIA.

Peach, medlar, apple, rose, almonds.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Pentagynia. 5. Polygynia.

13. POLYANDRIA.

Poppy, larkspur, columbine, piony, tea, water-lily.

1. Monogynia. 2. Digynia. 3. Trigynia. 4. Tetragynia. 5. Pentagynia. 6. Hexagynia. 7. Polygynia.

CLASSES.

ORDERS.

With Examples under each.

- | | | |
|---|---|---|
| 14. DYDYNAMIA. | } | 1. Gymnospermia. 2. Angiospermia. |
| Hyssop, ground ivy, balm, fox-glove, eye bright. | | |
| 15. TETRADYNAMIA. | } | 1. Siliculosa. 2. Siliquosa. |
| Scurvy-grass, candy tuft, water cress, stock, woad, cabbage, turnips. | | |
| 16. MONADELPHIA. | } | 1. Triandria. 2. Pentandria. 3. Octandria. 4. Enneandria. 5. Decandria. 6. Endecandria. 7. Dodecandria. 8. Polyandria. |
| Geranium, mallow, cotton, althea frutex. | | |
| 17. DIADELPHIA. | } | 1. Pentandria. 2. Hexandria. 3. Octandria. 4. Decandria. |
| Fumitory, milk-wort, peas, beans, vetches. | | |
| 18. POLYADELPHIA. | } | 1. Pentandria. 2. Icosandria. 3. Polyandria. |
| Orange, chocolate nut, St. John's wort. | | |
| 19. SYNGENESIA. | } | 1. Polygamia æqualis.
2. Polygamia superflua.
3. Polygamia frustranea.
4. Polygamia necessaria.
5. Polygamia segregata.
6. Monogamia. |
| Violet, balsam, cardinal flower, compound flowers in general, as thistles, succory, dandelion, tansy. | | |
| 20. GYNANDRIA. | } | 1. Diandria. 2. Triandria. 3. Tetrandria. 4. Pentandria. 5. Hexandria. 6. Decandria. 7. Dodecandria. 8. Polyandria. |
| Orchis, lady's slipper, arum, vanilla, birth wort, passion flower. | | |
| 21. MONOECIA. | } | 1. Monandria. 2. Dian-dria. 3. Triandria. 4. Tetrandria. 5. Pentan-dria. 6. Hexandria. 7. Heptandria. 8. Polyandria. 9. Monadel-phia. 10. Syngenesia.
11. Gynandria. |
| Oak, mulberry, nettle, cy-prus, fir, cucumber, box, birch, beech, and various other trees. | | |

CLASSES.

ORDERS.

With examples under each.

22. DIOECIA.

Willow, hop, spinach, poplar, mercury, juniper, butcher's broom, papaw, yew.

23. POLYGAMIA.

Fig, pelitory, orach.

24. CRYPTOGAMIA.

Ferns, mosses, mushrooms, flags.

{ 1. Monandria. 2. Diandria.
3. Triandria. 4. Tetrandria.
5. Pentandria. 6. Hexandria.
7. Octandria. 8. Enneandria.
9. Decandria. 10. Dodecandria.
11. Polyandria. 12. Monadelphia.
13. Syngenesia. 14. Gynandria.

{ 1. Monoecia. 2. Dioecia.
3. Tryoecia.

{ 1. Filices. 2. Musci. 3. Algæ.
4. Fung.

APPENDIX—Palmæ, which are not reducible to either.

6. Q. Is this distribution of plants into twenty-four classes universally followed?

A. Some of the disciples of Linnæus, among whom is Thunberg, his successor at Upsal, Jacquin in Germany, and Sibthorp and Whithering in England, with many living botanists in different countries, have reduced the classes to twenty, by distributing *gynandria*, *monoecia*, *dioecia*, and *polygamia*, among the rest.

7. Q. Is this a beneficial improvement?

A. If universally followed, it would undoubtedly, simplify the study of botany ; but while some adhere to the original classification, and some to the reformed, much confusion is introduced among the lovers of the science. It is probable, however, that the reformed system will ultimately prevail.

8. Q. In what does the essence of a plant consist ?

A. According to Linnæus, the essence of a plant consists in the fructification ; the essence of the fructification in the flower and fruit ; the essence of the flower in the anthers and stigma ; and the essence of the fruit in the seed. Hence, he considers the fruit and the flower as the foundation of his generic distinctions.

9. Q. What is a genus.

A. A genus is an assemblage of several species of plants, resembling each other in their most essential parts. Hence, it may be aptly compared to a family, all of whom bear the same surname, though every individual is distinguished by a particular specific name.

10. Q. What constitutes the genus?

A. The presence or absence, the number, figure, proportion and situation of the several parts. But as there are few genera in which all the parts of natural character are constant in every species, Linnæus found it necessary to fix on such circumstances as are constant in both genus and species; and for this reason had recourse to the nectary and other permanent marks of distinctions.

11. Q. What constitutes a species?

A. As generic differences depend on the form of the fructification, and are confined to that alone, so specific differences take their rise from any circumstance, wherein plants of the same genus are found to disagree, provided such circumstance is constant, and not liable to alteration by culture or other accidents. Hence, Linnæus asserts, that the species are as many as there were different forms of vegetables produced at the creation. The root, the trunk, the branches, the leaves, the props, may all

furnish specific differences, though all of them agree in the essential generic character.

12. Q. Is it necessary to distinguish those differences ?

A. Without distinguishing them particularly, and being acquainted with the names by which they are expressed, it is impossible to make any solid progress in botanical knowledge.

13. Q. What are varieties ?

A. All casual differences are to be considered as varieties of the same species. These varieties are grounded chiefly on sex, magnitude, time of flowering, colour, scent, taste, virtues, and uses, duration, multitude, pubescence, leaves, and monstrous flowers.

14. Q. What is meant by monstrous flowers ?

A. Monstrous, or luxuriant flowers, are those in which the essential parts of fructification are destroyed or effaced ; and therefore, however much they may delight flor-

sts, are disregarded by botanists. Flowers of this description may be *multiplicate*, *full*, or *proliferous*.

15. Q. What is meant by a multiplicate flower ?

A. Flowers are said to be multiplicate when, by the increase of the corolla, only a part of the stamens are excluded. Poly-petalous, or many leaved flowers, are the most subject to multiplication.

16. Q. What is meant by a full flower ?

A. A full flower is, when the corolla is so far multiplied as to exclude all the stamens. The fullness arises from the stamens running into petals, with which the flower is so crowded as frequently to choak up the pistillum also. The parts essential to generation, being thus destroyed, it is evident they must be barren ; and this is known by any person who cultivates a flower garden, to be the case with full, or, as they are usually called, double flowers.

17. Q. What is meant by a proliferous flower ?

A. Flowers are said to be proliferous, when one flower grows out of another, either from the centre or from the side. Instances of the former we see in pinks, anemones, and roses ; of the latter, in scabious, and particularly in daisies. The hen-and-chicken daisy, as it is commonly called, is a proliferous flower.

CHAP. IV.

Natural Orders.

1. Q. Is there not a natural method of arranging vegetables which deserves to be noticed ?

A. Notwithstanding the vast superiority of the sexual system, and its general adaptation to botanical pursuits, various botanists, and among the rest, Linnæus himself, have paid great attention to NATURE'S SYSTEM of arrangement, a knowledge of which has some peculiar advantages. On this principle Linnæus divides the vegetable kingdom into fifty-nine natural classes, or orders.

2. Q. Will you have the goodness to give me their names and examples ?

A. Most readily ; but we must go through them in succession.

3. Q. Which then is the first of the natural orders ?

A. *Palmæ*, palms, and some genera that

agree with them ; as the cocoa nut, the date-tree, &c.

4. Q. Which is the second ?

A. *Piperitæ*, or pepper-bearing plants, and some others that resemble them ; as arum, or cuckow-pint.

5. Q. Which is the third ?

A. *Calamariæ*, or reed-like plants. In these the leaf is entire at the base, and they have no joints nor petals ; as rush-grass, &c.

6. Q. Which is the fourth ?

A. *Gramina*, grasses ; as rye-grass, wheat, &c.

7. Q. Which is the fifth ?

A. *Tripetaloidæ*, plants with three petals ; as calamus, rush, &c.

8. Q. Which is the sixth ?

A. *Ensataæ*, plants with sword-shaped leaves ; as iris, or fleur-de-luce, corn-flag, &c.

9. Q. Which is the seventh ?

A. *Orchidææ*, orchises and such as resemble them in habits, powers, and sensible

qualities ; as the orchis, ophrys, satyrium or lizard flower, &c.

10. Q. Which is the eighth ?

A. *Scitamineæ*, aromatic plants, and some others which agree in habit, and afford agreeable fruit ; as plaintain-tree, ginger, &c.

11. Q. Which is the ninth ?

A. *Spathaceæ*, plants whose flowers are contained within a spatha, or sheath ; as narcissus, snow-drop, daffodil, &c.

12. Q. Which is the tenth ?

A. *Coronariæ*, plants of the garland or lily tribe ; as tulip, lily, frittillary, hyacinth, &c.

13. Q. Which is the eleventh ?

A. *Sarmentosæ*, plants with climbing stems and branches ; as black briony, rough bind-weed, &c.

14. Q. Which is the twelfth ?

A. *Holorasceæ*, pot-herbs, or plants for the table, and other domestic uses ; as spinach, beet, orach, &c.

15. Q. Which is the thirteenth ?

A. *Succulentæ*, succulent and fleshy plants, as house-leek, stone-crop, cactus, &c.

16. Q. Which is the fourteenth ?

A. *Gruinales*, plants supposed to resemble the crane, and like the geranium in habit; as flax, sun-dew, wood-sorrel, geranium, &c.

17. Q. Which is the fifteenth ?

A. *Inundatæ*, plants which grow in the water; as mare's tail, pond-weed, &c.

18. Q. Which is the sixteenth ?

A. *Calycifloræ*, plants with the stamens inserted into the calyx, and having no corolla, with a pulpy fruit; as wild olive, sea buckthorn, &c.

19. Q. Which is the seventeenth ?

A. *Calycanthemæ*, plants with the corolla and stamens inserted into the calyx; as willow-herb, evening primrose, &c.

20. Q. Which is the eighteenth ?

A. *Bicornes*, plants with horned anthers; as heath, strawberry-tree, whortleberry, &c.

21. Q. Which is the nineteenth ?

A. *Hesperideæ*, plants resembling the myrtle in habit ; as guayava, clove-tree, &c.

22. Q. Which is the twentieth ?

A. *Rotaceæ*, plants with a flat wheel-shaped petal ; as pimpernel, gentian, &c.

23. Q. Which is the twenty-first ?

A. *Preciæ*, early flowering plants ; as the primrose, and others that agree in habit ; such as the cow-slip, sow-bread, water-violet, &c.

24. Q. Which is the twenty-second ?

A. *Paryophylleæ*, plants of the pink, or carnation tribe, and such as are allied to them ; as lychnis, sprattling poppy, soap-wort, &c.

25. Q. Which is the twenty-third ?

A. *Trihilatæ*, plants with three seeds, each marked with a scar ; as bead-tree, maple, horse-chestnut, Indian-cress, &c.

26. Q. Which is the twenty-fourth ?

A. *Corydales*, plants with hooded or helmet-shaped flowers ; as butter-wort, water milfoil, &c.

27. Q. Which is the twenty-fifth ?

A. *Putamineæ*, plants whose fruit is covered with a hard woody shell ; as capperbush, bastard-mustard, calabash-tree, &c.

28. Q. Which is the twenty-sixth ?

A. *Multisiliquæ*, plants which have many seed-vessels ; as piony, columbine, marsh-marigold, anemone, &c.

29. Q. Which is the twenty-seventh ?

A. *Rhæadæ*, plants of the poppy tribe, or such as resemble them in habit ; as prickly-poppy, poppy, duck's foot, &c.

30. Q. Which is the twenty-eighth ?

A. *Luridæ*, plants of an ominous appearance, and hurtful, or noxious ; as mullein, fox-glove, the night-shades, &c.

31. Q. Which is the twenty-ninth ?

A. *Campanaceæ*, plants having bell-shaped flowers ; as convolvulus, bell-flower, Greek valerian, &c.

32. Q. Which is the thirtieth ?

A. *Contortæ*, plants with a monopetalous corolla, twisted or bent towards one side ; as periwinkle, dog's bane, swallow-wort, &c.

33. Q. Which is the thirty-first ?

A. *Vepraculæ*, plants of the bramble kind, resembling the mezereon, leather-wood, sparrow-wort, thesium, &c.

34. Q. Which is the thirty-second ?

A. *Papilionacæ*, plants somewhat resembling the butterfly in shape, of which number are the leguminous plants, pease, vetches, lupines, lucern, trefoil, &c.

35. Q. Which is the thirty-third ?

A. *Lomentacæ*, plants which furnish a fine dye, with others resembling them in habit; as mountain-ebony, wild senna, Judas-tree, locust-tree, milk-wort, acacia, &c.

36. Q. Which is the thirty-fourth ?

A. *Cucurbitacæ*, plants resembling the gourd in figure, habits, virtues, and sensible qualities; as cucumber, melon, passion-flower, pumpkin, &c.

37. Which is the thirty-fifth ?

A. *Senticosæ*, plants of the brier kind, and others that resemble them in external appearance; as bramble, rose, raspberry, ladies' mantle, cinquefoil, &c.

38. Q. Which is the thirty-sixth ?

A. *Pomaceæ*, plants with a pulpy, esculent fruit, of the apple, berry, and cherry kind ; as apple, pear, medlar, wild service tree, currantbush, peach, apricot, plum, &c.

39. Q. Which is the thirty-seventh ?

A. *Columniferæ*, plants whose stamens and pistils have the appearance of a column in the middle of the flower ; as mallow, tea-tree, holly-oak, althea frutex, cotton, &c.

40. Q. Which is the thirty-eighth ?

A. *Tricoceæ*, plants with a single three-cornered capsule, having three cells, each containing one seed ; as box-tree, papaw, spurge, mercury, palma-christi, &c.

41. Q. Which is the thirty-ninth ?

A. *Siliquosæ*, podded plants ; as mustard, scurvy-grass, moon-wort, cabbage, &c.

42. Q. Which is the fortieth ?

A. *Personatæ*, plants with a masked flower ; as snapdragon, louse-wort, eye-bright, penny-rattle, &c.

43. Q. Which is the forty-first ?

A. *Asperifoliæ*, rough-leaved plants, as

borrage, viper-grass, comfrey, stone-crop, &c.

44. Q. Which is the forty-second ?

A. *Verticillatæ*, plants with their flowers growing in whorls, and with four naked seeds, as thyme, savory, hyssop, lavender, &c.

45. Q. Which is the forty-third ?

A. *Dumosæ*, plants which are thick set with irregular branches, and bushy ; as holly, sumach, spindle-tree, elder, way-faring-tree, &c.

46. Q. Which is the forty-fourth ?

A. *Sepiariæ*, or woody plants suitable for hedges ; as ash-tree, privet, lilac, &c.

47. Q. Which is the forty-fifth ?

A. *Umbellatæ*, plants of the umbelliferous kind ; as carrot, parsnep, angelica, anise, &c.

48. Q. Which is the forty-sixth ?

A. *Hederaceæ*, plants resembling the ivy ; as vine, wild-grape, ginseng, &c.

49. Q. Which is the forty-seventh ?

A. *Stellatæ*, starry plants, with two nak-

ed seeds, and leaves round the stem, in form of a star ; as woodruff, ladies' bedstraw, madder, cross-wort, coffee-tree, dog-wood, &c.

50. Q. Which is the forty-eighth ?

A. *Aggregatæ*, plants having a number of florets, with each a proper and common calyx ; as teasel, scabious, honey-suckle, &c.

51. Q. Which is the forty-ninth ?

A. *Compositæ*, plants with compound flowers ; as burdoc, thistle, lettuce, tansy, worm-wood, &c.

52. Q. Which is the fiftieth ?

A. *Amentaceæ*, plants bearing catkins ; as sallow, poplar, birch, &c.

53. Q. Which is the fifty-first ?

A. *Coniferæ*, conebearing plants ; as pine, cypress, juniper, yew, &c.

54. Q. Which is the fifty-second ?

A. *Coadunatæ*, plants with numerous seed-vessels joined together, so as to form a single round, or conical fruit ; as magnolia, tulip-tree, annona, &c.

55. Q. Which is the fifty-third ?

A. *Scabridæ*, plants with rugged or brist-
 leaves ; as fig, pellitory, nettle, &c.

56. Q. Which is the fifty-fourth ?

A. *Miscellanææ*, miscellaneous plants, not
 reducible to either of the preceding orders ;
 as dyer's weed, burnet, duck-meat, water-
 ly, globe amaranth, pine, &c.

57. Q. Which is the fifty-fifth ?

A. *Felices*, plants of the fern kind ; as
 polypody, brakes, maidenhair, spleenwort,
 &c.

58. Q. Which is the fifty-sixth ?

A. *Musci*, mosses ; as thread-moss, wa-
 r-moss, club-moss, hair-moss, bog-moss,
 &c.

59. Q. Which is the fifty-seventh ?

A. *Algæ*, plants of the flag kind ; as lich-
 e, marchantia, fucus, conferva, &c.

60. Q. Which is the fifty-eighth ?

A. *Fungi*, plants of the mushroom kind ;
 agaric, puff-ball, boletus, morell.

61. Which is the fifty-ninth ?

A. *Dubii ordinis*, or plants of a doubt-
 ful order ; as barberry, dodder, plantain, &c.

CHAP. V.

Accidents, and Qualities of Plants, &c.

1. Q. What is meant by the habitats of plants ?

A. That disposition which plants show for peculiar soils and situations, even in the same climate ; while almost every climate has its diversity of vegetables.

2. Q. Do plants correspond with each other in the same climates, throughout the globe ?

A. By no means. The climate respects the latitude, longitude, and altitude, of the place, or its elevation above the level of the sea. Latitude alone is not sufficient ; as, for instance, Rome in Italy, Pekin in China, and New-York in America, are situated nearly under the same degree of north latitude, yet their plants are very different. Again ; Palestine and Florida on the north, and the Cape of Good-Hope and Chili on the South, are nearly under the same lati-

tude, but the plants of those countries are not at all similar.

3. Q. Is it not altitude then that has the most considerable influence?

A. It certainly is ; for the aquatic plants of India often agree with those of Europe ; as sun-dew, the water-lily, arrow-head, &c. ; while the plants of Lapland, Greenland, Siberia, Wales, Scotland, Switzerland, Olympus, Ararat, and the Brazils, are often the same, though growing in places so remote from each other.

4. Q. Is there any general arrangement of plants according to their habitats ?

A. They may be arranged under the six following heads ; —1. *Aquatic* ; 2. *Alpine* ; 3. *Hilly* ; 4. *Shady* ; 5. *Campaign* ; and 6. *Parasitic plants* ; each of which contains several subdivisions.

5. Q. Will you give me an example of aquatic plants ?

A. In the sea grow many of the *confervas*, some *charas*, *ulvas* or *lavers*, all the

fucuses, grass-wrack, &c. On the sea-shores, are sea buck-thorn, sea purslane, sea orache, sea star-wort, sea milk-wort, sea holly, sea lavender, sea plantain, sea worm-wood, sea colewort, marsh samphire, prickly glass-wort, and many others. In lakes we find quill-wort, yellow and white water lily, pond-weed, water milfoil, gladiole, river horse-tail, awl-wort, bastard plantain, &c. In more shallow waters grow water caltrops, several kinds of pond-weed, vernal and autumnal star-wort, water-soldier, frog's-bit, arrow-head, flowering rush, water violet, water-hemlock, water parsnip, sweet-flag, flote fescuegrass, brook-lime, water-cresses, clubrush, marsh fleabane, loose-strife, water horehound, hemp agrimony, willow herb, water-mint, water germander, water radish, &c. In places subject to be flooded, we find alder, different kinds of willow, arrow-headed grass, burnet, dwarf honeysuckle, marsh marigold, calathian violet, strawberry trefoil, marsh chickling vetch, small fleabane, allseed, &c. In spongy, springy

ground, grow gale, water avens, grass of Parnassus, meadow-sweet, wild angelica, white lady's bed-straw, mat-grass, &c. In bogs, and turfy-ground, grow common bog-moss, dwarf clubrush, cotton grass, cross-leaved heath, cranberries, sundew, butterwort, smooth horse-tail, &c.

6. What are Alpine plants ?

A. Alpine plants, so called from the Alps in Switzerland, are such as grow on or near the tops of very high mountains, or in forests on the side of such high mountains. Of this description are dwarf birch, herbaceous willow, mountain strawberry-tree, mountain avens, bastard cinquefoil, rosewort, several of the saxifrages, globe flower, Scottish asphodel, mountain colt's-foot, mountain sow-thistle, &c.

7. Q. What plants delight in hilly situations ?

A. Among those which delight in dry, sandy, and gravelly hills, scorched with the sun, are common sallow, sloe-tree, hawthorn, dog-rose, yellow medick, creeping trefoil,

lady's mantle, white corn campion, bulbous crow-foot, bird's nest, hop trefoil, meadow soft grass, &c. On the declivities, or dry sloping sides of little hills, grow oak, white beam-tree, mountain ash, garden plum, honey-suckle, burnet, rose, horn-beam, common maple, mountain trefoil, perforate St. John's wort, bloody crane's bill, white saxifrage, milkwort, yarrow, adder's tongue, crested cow-wheat, &c. In rocky and stony places, are found raspberry bush, different species of stone-crop, house leek, polypody, wall-rue, Solomon's seal, herb Robert, stone bramble, melick grass, creeping pea, Nottingham catchfly, mountain hair grass, &c.

8. Q. What plants delight in groves and woods ?

A. All the shady plants delight in such situations ; as beech, ash, hazel, lime, greater maple, buckthorn, cluster cherry, spindle-tree, mountain currants, spurge olive, blackberry-bearing alder, sweet-brier, bramble, millet-grass, enchanter's nightshade,

sanicle, yellow nettle hemp, May lily, yellow star of Bethlehem, cowslips, great throatwort, herb paris, wood-roof, fir, yew, juniper, barberry, trembling poplar, birch, black whorts, winter-green, wood anemone, several species of club-moss, yellow cow-wheat, upright cudweed, &c.

9. Q. What plants are most common in champaign situations ?

A. On heaths, commons, fields, and fallows, we find such plants as dewberry-bush, prickly restharrow, small bind weed, corn-mint, poppy, pease, gold of pleasure, nipple wort, smooth tare, wart wort, loose panic grass, Deptford pink, bearded wild oats, annual darnel, silky bent grass, and broom grass. In closes, ploughed lands, and on dung-hills, rubbish, &c. grow herb gerrard, dandelion, fool's parsely, orache, blite, shepherd's purse, nettle, spurge, common elm, cat-mint, wormwood, plantain, white briony, hound's tongue, motherwort, henbane, vervain, weld, mallow, knot-grass, ragwort, &c. In meadows and pastures we find such

plants as the following :—Apples, pears, darnel, meadow trefoil, dropwort, various kinds of hair-grass, cat's tail grass, fox-tail grass, yellow devil's bit, purging flax, goat's beard, &c. In shady ground grow sand willow, common broom, dyer's weed, privet, lime grass, stone pink, several kinds of carex, wild thyme, toad-flax thrift, fescue grass, mouseear, chickweed, cudweed, spurry, lamb's lettuce, mouse-tail, sea canary grass. In clayey ground are found, common colt's foot, hairy plantain, lady's finger, common cinquefoil, wild succory, middle fleabane, &c. In chalky ground, saintfoin, tufted horse-shoe vetch, lesser throatwort, base rocket, wall flower, &c.

10. Q. What is meant by parasitical plants?

A. Such as grow on the trunks, branches, and roots of trees, or other plants; as mistle-toe, dodder, bird's nest, ophrys, toothwort, broom rape, besides various mosses, lichens, and funguses.

11. Q. Will not plants grow in any situation?

A. No doubt each soil has its native plants, as we have just seen; yet, by care and cultivation we may make vegetables grow in almost any soil. Hence, so many different kinds in gardens.

12. Q. Has not climate great influence on the time of the leafing, flowering, and decaying of different plants?

A. The greatest possible; and, even in the same climate, exposure to the sun or shade, makes a considerable difference in the appearance, maturity, and decay, of annuals, and indeed of all plants, as far as regards their foliation, &c.

13. Q. What is meant by the watching or vigils of plants?

A. The quality which many possess of opening and shutting their flowers, according to the state of the weather, or the time of the day; and hence called solar plants. They are of three sorts;—1. Meteorical plants, or such as are affected by the state

of the atmosphere. 2. Tropical, or such as open in the morning, and shut before night. 4. Equinoctial, or such as open precisely at a certain hour of the day and shut up again at a determinate hour. Nothing is more curious than this part of Botany ; but I cannot in this place, enter into details.

14. Q. Are not the virtues and uses of plants of great importance to be known ?

A. Certainly they are, and in all ages, the scientific have applied themselves to make discoveries of this kind ; though, as they have long proceeded without judgment, some trusting to experience only, and others forming fanciful theories, from astrology and the doctrine of signatures, or the imaginary resemblance that plants had to different parts of the human body, for which they were reputed specifics, it is only to the moderns that we are indebted for any accurate knowledge of the virtues and qualities of plants.

15. Q. Will you favour me with some rules for acquiring this kind of knowledge ?

A. It must be derived from the fructification ; observing, at the same time, the taste, smell, colour, and place of growth. In general it may be observed, that all plants of the same genus agree in their virtues ; those of the same order, in the natural method, are nearly of the same virtues ; and those which are of the same natural class, have, in some measure, the same virtues also. Thus all the species of *allium*, viz, garlic, onion, leek, cives, eschalots, rockambole, &c. have the same sensible qualities ; and this in a great degree, holds good of the natural classes, as in umbelliferous, compound, papilionaceous plants, and several others.

16. Q. This appears to be the most pleasing and useful part of botany ; and you will oblige me by distinguishing the virtues and qualities of the most remarkable and valuable natural classes.

A. I am glad that I have awakened your curiosity. I will begin with grasses, comprehended in the sexual system, under *triandria digynia*, and constituting the fourth

order of the natural method. These all furnish nourishment and support to men and animals; the grassy herb is the common food of our flocks, herds, and beasts of burden; the seeds of many grasses are greedily devoured by poultry and small birds; and the larger seeds, or grain, as wheat, rye, barley, oats, rice, millet, &c. all constitute the daily food of mankind. Among this large and numerous tribe there is not one poisonous species. The sugar-cane, whose produce, though formerly a luxury, is now become a necessary in domestic economy, belongs to it.

17. Q. Have not the starry plants some peculiar virtues?

A. The starry plants, among which are madder, woodroof, &c. belonging to the *tetrandria monogynia*, and the forty-seventh order of the natural method, are all diuretic, and some of them are employed in medicine on that account.

18. Q. What is the character of the rough-leaved plants?

A. Those which belong to the *pentandria monogynia*, and forty-first order of the natural method, are all more or less of the oleraceous kind, and are also mucilagenous and glutinous. Of the oleraceous kind, are borragé, alkanet, &c. of the mucilagenous, comfrey-root, &c.

19. Q. What have you to observe of the lurid plants?

A. Lurid plants are such as have a forbidding aspect, or disagreeable smell, belonging to the *pentandria monogynia*, and twenty-eighth natural order, are mostly berry-bearing plants, and generally poisonous.—Among these we find the nightshades, winter cherry, mad apple, henbane, tobacco, mullein, &c. Even potatoes, which when dressed, are such a valuable aliment, belong to the family; and some parts of the plant are not free from the general character.

20. Q. What is the character of the umbelliferous plants?

A. Umbelliferous plants, belonging to the *pentandria digynia*, and forty-fifth order of

the natural method, when they grow naturally in dry soils, are aromatic and heating ; when in watery places, they are often poisonous. Of the former kind are wild carrot, fennel, carraway, anise, parsley, &c. ; of the latter are hemlock, dropwort, common water hemlock, wild smallage, least water parsnep. The virtues of umbelliferous plants reside in their roots and seeds.

21. Q. What may be observed of plants belonging to the *hexandrious* class ?

A. Plants of this class, belonging to the ninth and tenth orders of the natural method, have roots which are either esculent or poisonous, according to their smell and taste. The strong disagreeable smell of the roots of snow-drops, squills, hyacinths, &c. warns us to avoid them. Even onions and leeks are acrimonious and corrosive, when raw, if taken in too large quantities ; but roasted, or boiled, they become esculent and pleasant. The roots of such as have no smell, may be eaten safely ; even the tulip is used for food in Italy.

22. Q. What may be observed of the *bicornes*?

A. The *bicornes*, or plants with horned anthers, belonging to the eighth and tenth classes, and the eighteenth natural order, are astringent, and their acid berries, such as whorts, bear berries, &c. esculent.

23. Q. From which class and natural order have we our fruits?

A. From the class *icosandria*, and the nineteenth, thirty-fifth, and thirty-sixth natural orders, we have the pulpy fruits, which are esculent and wholesome; such as apples, pears, pomegranates, wild service, medlar, hips, bramble, raspberry, strawberry, almond, peach, plumb, apricot, cherry, &c. Not one plant of this class has poisonous fruit; and but few have deleterious leaves.

24. Q. What may be observed of the *polyandrious* class?

A. Plants of this class belonging to the twenty-sixth, and twenty-seventh natural orders, are chiefly poisonous. Among these are wolf's bane, columbines, larkspur, helle-

bore, pasque flower, piony, water lily, spurge, &c. all of which are more or less noxious. Even tea is dangerous when fresh cured; and, at best, is under every circumstance unfriendly to nature.

25. Q. What is the character of the verticillate plants?

A. Those which belong to the *didynamia gymnospermia*, and the forty-second natural order, are fragrant, nervine, resolvent, and deobstruent; their virtue chiefly residing in their leaves. There is no poisonous or hurtful plant of this family. The Syrian marum is the most fragrant of plants, and acts powerfully on the olfactory nerves; marjoram, pennyroyal, mint, baum, lavender, rosemary, sage, clary, &c. are all highly fragrant, and useful in nervous disorders.

26. Q. What may be observed of the podded plants?

A. They are the *tetradynamia* class, and thirty-ninth natural order, including scurvy-grass, horse-raddish, water cresses,

mustard, &c. none of which are noxious, or hurtful. The virtues of these plants are lost by drying. Such as grow in moist or watery places, when fresh, are acrid, astringent, and diuretic. Many of the tetradynamious are used as pot-herbs.

27. Q. Will you give me the character of the pillar-bearing plants ?

A. The *columniferæ*, or pillar-bearing plants, belonging to the thirty-ninth natural order, and the *monadelphica* 'polyandria class, have all an emolient or softening quality. Whoever is acquainted with the nature of mallows, and marsh mallows, knows the effects of them all. Not one of them is poisonous or hurtful.

28. Q. What may be observed of the papilionaceous plants.

A. These belong to the *diadelphica decandria* class, and the thirty-second natural order. Their leaves are eaten by cattle and beasts of burden ; and their seeds, which are farinaceous and flatulent, are the food of various animals ; some of them, as pease and

beans, are eaten by men ; but, except for strong and sound stomachs, they are improper, especially if not well boiled. Among all the leguminous or papilionaceous tribes, there are no deleterious or hurtful plants.

29. Q. What is the character of the syngenesious plants ?

A. Plants of the *syngenesia* class and the forty-ninth order of the natural method, are commonly bitter, and many of them used in medicine. We find among them colt's foot, pillitory, leopard's bane, succory, viper's grass, dandelion, wormwood, southernwood, tansy, chamomile, golden rod, daisy, yarrow, carline, thistle, hawkweed, &c. Except the wild lettuce, with a milky juice the leopard's bane, and the safflower, and perhaps a few others, none are poisonous.

30. Q. To what class and natural order do the *orchis* tribe belong ?

A. The *orchideæ* belong to the *gynandria diandria* of Linnæus, and the seventh natural order. The roots of all are highly

nutritious, and many of them might be cultivated with advantage. When fresh, they smell rather rank.

31. Q. What have we to observe of the cone-bearing plants ?

A. These belong to the fifty-first natural order, and are all resinous and diuretic. Among them we find pines, firs, junipers, cypress, turpentine-tree, savin, &c. They are evergreen, and possess considerable medical properties.

32. Q. Have you any thing to remark of the *cryptogamia* class ?

A. This class which includes the fifty-fifth, fifty-sixth, fifty-seventh, and fifty-eighth natural orders, contains chiefly suspected or dangerous plants. Some of the *fungi* are esculent, though none are perfectly safe ; a few of the lichens and ferns are useful in medicine ; but most plants of this class have a disagreeable flavour, or bad smell, which warns us of their danger.

33. Q. Is smell then an indication of the qualities of plants ?

A. Not only smell, but taste and colour indicate qualities. The external senses indeed, are the natural instruments by which animals are to explore the qualities of plants and other substances ; and they seldom direct wrong. The Author of Nature, however, has not only given different animals different tastes, but has provided that some plants should be acceptable and salutary to one class of animals while they are dangerous or destructive to others. Sapid and sweet-smelling plants are generally safe ; nauseous and stinking ones are often the contrary.

34. Q. May not the qualities of plants be altered by soil and situation ?

A. Certainly they may. A dry soil renders plants more aromatic ; a moist soil, more insipid ; and a watery soil more corrosive ; but the latter will lose a great part of their acrimony, if cultivated in a dry place.

35. Q. How do medicinal plants act on men and animals ?

A. They either act by their *effluvia* on

the nerves, or by their sapid parts on the muscular fibres, or by both on the fluids. Some plants will give a disagreeable taste to the milk or the flesh of animals feeding on them ; and some even stain the bones. The flowers of the tuberose will make an hysterical woman faint ; cinnamon has a powerful effect on the nervous system ; the flowers of oleander will bring on a kind of apoplexy ; and the smell of rue will recover such as are overcome with fragrant odours. All the Europeans who first landed in Surinam, died suddenly, without any one being able to assign the cause ; but at last it was traced to the smell of the manchineel-tree. The shade of walnut, elder, &c. is prejudicial to those who sleep or sit under it. The very smell of *coloquintida* will both vomit and purge ; but it would be endless to enumerate all the effects of plants.

36. Q. Though some plants may be hurtful, are they not in general of great use ?

A. Their economical uses are so great

that without them, neither men nor animals could be supported. They furnish not only food, but medicine. They supply materials for building houses, ships, carriages, and agricultural implements; for dyeing and tanning; for painting; for raiment, as flax and cotton; for pleasure, for commerce, and for ornament; and, in short, are applicable to every purpose of life.

FINIS.

